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THE CENTER LINE

MONTANA HIGHWAY COMMISSION

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AERIAL OBLIQUE PHOTOGRAPHY

We have been asked many times how we take our aerial pictures. The answer is: That over a period of three years, using trial and error methods, scrounging parts here and there, prevailing on our friends at the lab and shop, using a few moonlight requisitions, and using the ingenuity of a few people, we have arrived at a point where we take a lot of pride in the aerial obliques that we obtain.

The photos that we have obtained have assisted in telling stories to the public, and to support and make graphic reports to BPR personnel in Portland and Washington. We find that we have a pictorial account of most of the major jobs in the state, and authentic photos of major events, such as the earthquake in the Madison Canyon, as well as aerial portraits of the major structures that have been completed. Right-of-way makes extensive use of aerial obliques, and use is also made of the work in public hearings.

Our first attempts were very clumsy, and the results were far from acceptable, but we found out that it was possible to get pictures. Using an old Speed Graph camera, with the collapsible hood, and shooting out of an opened window of a Cessna 182, it was difficult to get the camera out in the slipstream and maintain any semblance of focus or to keep the camera on the subject. It was about this time that a Piper Apache was leased, and a Crown Graphic was obtained. We discovered that by leaving the baggage door off, and by the cameraman strapping himself to the back of the back seat, he could obtain a clear shot of the subject as the plane flew past. The cameraman would advise the pilot when the subject was in view, and a steep bank to the left would lift the right wing out of the picture. If the signals were not coordinated well, we also found that such a steep bank would also

lift the camera and cameraman right out of the picture, so timing required good signals between pilot and cameraman.

If the air was rough, it was also difficult for the cameraman to operate, as many times at the crucial moment an air bump would push the camera back into his face and eyes, and with the sharp edges of the camera, we found that the cameraman was coming home looking as if he had been used for a sparring partner.

We then decided to purchase an authentic aerial lense. We had nothing to put it on, but we discovered an old Speed Graphic at the lab that we were able to talk them out of. It had a shutter speed of 1/1000, and after installing the 7" Aerial Ektar 2.5 lens, we got some very good pictures. There were still problems however, as it was soon discovered that the home-made camera would not remain in focus, and we began to get fuzzy pictures.

At this point we were stymied, because there were no funds for a new camera in our budget. It was at this point that we decided to call on some of the human resources we have in the Highway Department.

Marv Kalland, one of the photographers, and who has only a quarter or so to go to get his degree in Architecture, got out his drafting tools, and designed a camera that could be built by our machinist. After many conferences, and changes in the design, the final plan was given approval. The design called for one thickness of aluminum so that the size and machine work could be kept to a minimum. Precise measurements were taken of the old camera so that we could still utilize the 1/1000 shutter.

(Continued on page 2)

Project No.	Amount of Bid	Bidder	Address
F 217(12) U. 1, F 217(13) U. 1 and S 273(3) U. 1 Gardiner- Liv- ingston and Pray Siding-Millcreek Park County	\$612,096.80	Bud King & McLaughlin, Inc.	Missoula, Mont.
S 258(3) Rock Springs-Van Norman Garfield County	\$180,511.91	The O'Neil Construction Co.	Havre, Mont.
ROW S 304(2) Anaconda-Galen Deer Lodge County	\$ 3,543.96	Skinner Enterprises	Helena, Mont.

104-B STUDY PRESENTED TO CONGRESS

Word from Washington indicates that the results of the 104-B study of the Bureau of Public Roads shows the cost of completing the Interstate Highway System in the nation has not increased since 1958, and is still estimated to be \$41 billion. When Congress first set an estimate on completion of the Interstate in 1956, the figure was set at \$37 billion, and financing was based on this figure. Since that time, however, after a more thorough check could be made of estimated costs, it has risen to \$41 billion, and it is presumed that Congress will study the estimate very closely, in view of providing adequate financing for the completion of the Interstate System on schedule.

WORK UNDERWAY AS OF FEBRUARY 1

On February 1, as reported to Helena by each of the District Engineers, a total of 462.4 miles of highway construction were underway at a total cost of \$37,785,225. Broken down to systems, the reports indicated that construction was underway on 77.7 miles of Interstate; 194.9 miles of primary; 171.1 miles of secondary; and 2.4 miles of urban highway.

Buck Dundas' Butte District, apparently had the most work, money wise, with a total of \$9,218,150.27 worth of work underway. Oscar Ostenson in Missoula with \$8,396,569 barely nosed out Ben Briscoe of Great Falls with \$8,396,000. Paul Johnson in Billings was working on \$7,301,894.76 worth of contracts, and Bill Brittain had \$4,472,611.57 worth of contracts under way.

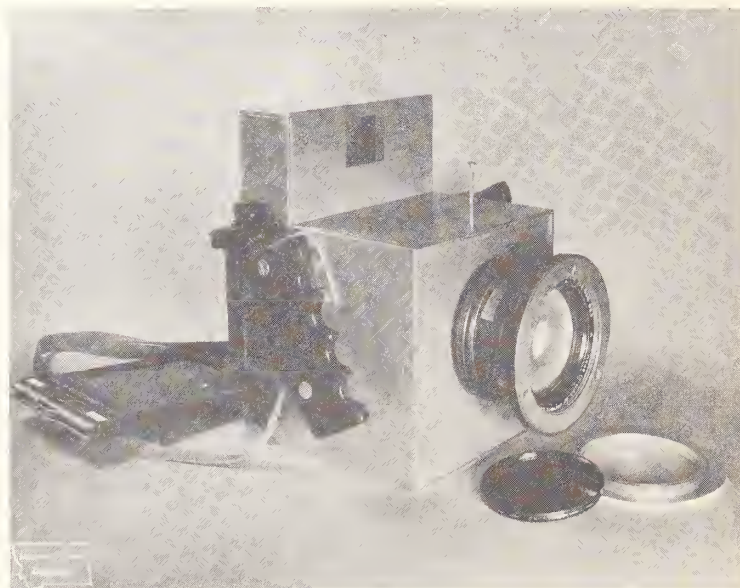
The same reports show that a total of 1,070 miles of highway were in the design stage, and surveys were being made on another 471 miles.

AERIAL OBLIQUE PHOTOGRAPHY

(Continued from page 1)

The handles are built of laminated 1/8" plexi-glass strips, glued and screwed together and filed, ground and sanded down to accommodate the hand, with grips for the fingers. A Graflock back was purchased for \$28.00 to accommodate the film holders.

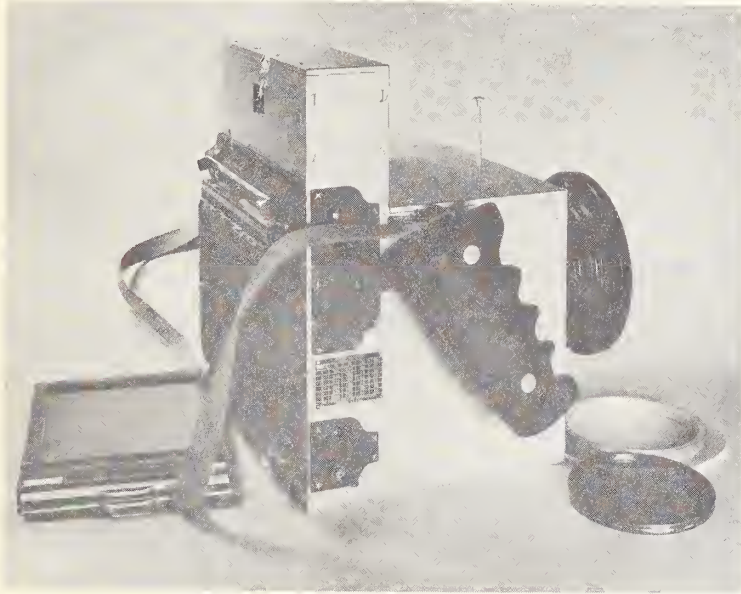
The plans, and the parts to be put together were then taken to the shop, where more conferences



with Pat Martin and Wiggie DeBree were held. Wiggee is the machinist and he had to put the camera together in the aluminum box, making sure at all times, that the optical axis remained perpendicular to the focal plane. Wiggee did a fine job, and the photos that we now obtain from our Piper Aztec are a credit to the ingenuity of the fellows that designed and put it together.

The finished product is heavy, but it is stable, and stays in focus. We tie it to the operator when it is in use, projecting from airplane windows and

doors, and as Chet Dreher, our Chief Photographer states, "The market value of an aerial camera falling through space at terminal velocity is extremely low." Chet's biggest worry now is, that if the camera falls, it might take the operator along.



The three views of the new camera show the results of what some ingenuity and fine craftsmanship can produce. Marv Kalland illustrates how the camera is held.



IMPORTANT VISITORS

It has been the pleasure of the Highway Department to have as visitors many members of the 37th Legislature during the session. Both the House Highway Committee, under Rep. Fred Broeder, and the Senate Highway Committee under Senator Charles Bovey, visited the building in a group, and were given a short tour. It was regrettable that the short time prevented each section from being able to fully describe their work,

but the heavy work-load of the lawmakers, and the busy routine they undergo for the 60 days, simply would not allow enough time to adequately describe our work. An open invitation was extended to all legislators, and many have taken time from their busy schedule to visit the building. We hope that all will try to get over to the Highway Building before the session is over.

We also extend an invitation to groups wishing to visit the building to do so. We are always happy to show interested people our building, and to demonstrate to them the planning, research, and design that goes into highway building, and the constant supervision and testing to make sure that the people of Montana and the highway user in general, obtain their money's worth in the construction of highways.

WORD FROM THE SAFETY SECTION

REAR END COLLISIONS

22 REAR END COLLISIONS IN 1960

The driver who follows too closely behind another vehicle may find himself in many situations demanding emergency stops. Each such stop has two hazards:

- (a) Ramming into vehicle ahead;
- (b) Being hit in the rear as we stop suddenly.

Follow at a safe distance, then sudden stops are unnecessary. Too, when we follow at a safe distance we do not have to concentrate on the back of the car ahead. We're in better position to see the entire width of the road, to see a child dashing from the sidewalk, to stop without hurting the child.

Avoid stopping almost under railroad gates or very close to railroad tracks. One driver did this, and a truck hit him in the rear just as a train roared past. He was pushed into the flying train.

When traffic is heavy, stop 10 feet behind the vehicle in front of you. This may be a life-saving situation. Don't rush toward intersections, hoping to make the green light, then, as the light changes, jam on your brakes and stop short. You're sure to have a tail-rider behind you, also hoping to get across, and never expecting you to stop suddenly.

REMEMBER: A little extra Care, makes accidents rare.

IBM 650 CONTINUES TO WORK FULL TIME

During the month of January, the IBM 650 kept up its busy routine, getting the payrolls out, doing bid tabulations, and working on the Parking Studies underway. This work took a total of 53.9 hours, while doing earthwork design on 93 miles of highway utilized another 113 hours. Checking earthwork construction took an additional 7.4 hours for a total of 174.9 hours. Work done on earthwork design was done at a cost of \$20.27 per mile.

RECOGNITION PINS

It is difficult to keep abreast of the longevity attained each month by many in the Department. For instance, in October, 47 employees attained either 5, 10, 15, 20, 25, or 30 year status with the Department for a total of 505 years for an average of slightly more than 10 years apiece. 18 of them were awarded their five year pin, 15 received recognition for 10 years of service; 8 for 15; 2 for 20; 3 for 25, and one for 30 years. Bruce Randall, Division Maintenance Engineer at Wolf Point received his 30-year pin, while Gip Woodahl and A. L. Moran of Helena, and Curtis McBride of Billings got recognition for being with us for 25 years. Next issue of Centerline will endeavor to bring us up-to-date on the service awards.



Nearly 5 miles of Interstate 94 has been completed and put into service just east of Glendive. The new road eliminates the narrow twisting portion of the old road. The job was completed by the bonding company, General Insurance Co. of America, after the contractor was unable to finish the project.

The Center Line
STATE HIGHWAY DEPARTMENT
Helena, Montana



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